Highlights

Vol.II No. 12
June 8, 1959

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Washington SCIENCE TRENDS

Defense Research and Engineering

Dr. Herbert York, Director of Defense Research and Engineering, has asked Congress to wait at least another year before ordering any major changes in the administration of R&D projects by the Pentagon.

York believes that more than enough reorganizing has taken place in the past few months. He would like some time to determine how well the present system will work.

His plea may stave off complaints from the Services and some legislators over the role of the Advanced Research Projects Agency. However, he admits that ARPA, which he formerly served as Chief Scientist, is "not quite as essential now as it was when it was first set up."

Tactical Satellite?

Vice Adm. John T. Hayward, who heads Navy Research and Development, calls for rapid development of small, complex satellites to be launched from airplanes for tactical combat operation.

"There are no physics laws," he declares, "that prohibit you from taking a solid rocket, flying it at 40,000 feet, and putting it in any orbit that you want...and this would give you a tactical application."

In the hands of a fleet commander, the Admiral explains, such a satellite "would be a great tool for tactical intelligence. He might want to know what radar stations were on, he might want to know what communications were on at a particular time..."

Mercury Heatsink

Aluminum Company of America hopes this week to forge the first of the large beryllium heatsink shields to be used for the manned capsule in Project Mercury. The development, under subcontract to Brush Beryllium, reportedly calls for the use of a stainless steel shield in the forging process.

Space Sciences

A few copies are still available of the Summary of Space Science Programs - NASA. Subscribers may write Service Department, Washington Science Trends, 1120 National Press Building, Washington 4, D.C. No charge.

Research Policies -- Office of Naval Research

Here, for guidance and future reference, is an up-to-date official summary of research policies of the Office of Naval Research.

* Unsolicited Proposals -- Virtually all basic research proposals submitted by the Office of Naval Research are unsolicited. This is a major policy of ONR. The aim is to encourage scientists to request support for work which they consider important without compromising their objectives by shaping them to a Navy Interest. All proposals are judged by absolute standards and are not placed in competition with each other.

Major Criteria -

(1) Scientific Merit -- The scientific merit of the proposal is evaluated. This is done against the background of the importance of the scientific field and the importance of the specific area within the field and to what probable degree more knowledge will be accumulated. We ask such questions as, is this good science? Is it likely to produce significant new scientific knowledge? In a few cases a new scientific field that appears to have special importance to the Navy is given special consideration in order to stimulate research in that area. Examples are oceanography and radio astronomy.

(2) Relevance -- The relevance of the proposed research project to the Navy mission is weighed. The knowledge to be gained from the research is evaluated from the viewpoint of how it will contribute to the long-range technical development and future evolution of the Navy; whether the research is in an area in which the Navy now has or could conceivably in the future have some interest.

(3) Competence -- The competence of the investigator is carefully reviewed including his background, experience, and general knowledge of the field. This size of the organization to which he is attached or the type of organization, whether academic, nonprofit, or industrial, plays no part in our consideration. In fact, all scientific dealings are directly with the investigator rather than through his organization.

There is no attempt made to establish a uniform distribution pattern in the award of ONR research contracts throughout the United States. ONR seeks to support only the best research in any particular field. Since ONR receives on the average about twice as many acceptable research proposals as can be supported by our budget; preference is determined on a highly selective basis.

ONR utilizes a variety of mechanisms in making the actual selection, using whatever means is appropriate for the scientific field involved. The same procedures, for example, would not be used for the comparatively small field of astronomy as for the broad field of chemistry.

First of all, ONR has maintained over the years a highly competent and experienced scientific staff, which is fully capable of evaluating a wide variety of proposals. In some fields, ONR makes use of standing advisory panels of scientists who have the highest national and even international reputations in the scientific community. The members of the panels are usually selected by the National Academy of Sciences or the appropriate national scientific society. Where appropriate, proposals are also referred to the Navy technical bureaus or laboratories for a critique.

At the same time, ONR engages in complete coordination and cooperation with the other Government research agencies, both military and civilian. Reports of proposals received as well as actions taken are exchanged on a monthly basis. This helps to avoid duplication and assures that a research proposal will be channeled to the agency which has the predominant interest in the type of research involved. In this way, a proposal that might be turned down by ONR because of lack of Navy interest might be accepted for support by another agency.

The underlying philosophy of the Navy in contributing to the support of this Nation's research effort is to provide the knowledge that will make certain a constantly advancing Navy - at the same time helping to foster a healthy nationwide scientific research program, which in itself will make it more profitable that we will have radical improvements in the future Navy.

Patent Searching Progress

U.S. Patent Office plans to double its professional R&D staff in the next year in the hope of finding new means to speed patent procedures. Despite extra funds in recent years the average "pendancy" of a patent now stands at close to three years and three months -- a reduction of about three and a half months since 1954.

Mechanical searching has been in operation for about a year in the examining division handling steroids. Operation has now been enlarged on a pilot basis to encompass not only chemical materials, but processes of making the materials and characteristics of the created materials. Searches through some 2,000 patent disclosures can be made in about four minutes with a commercial card-sorting machine. Quality of search work is said to be "very satisfactory."

Pilot operation is now being used in searches of an important subclass of the polymer field but the Patent Office has found "certain inadequacies" in this area and the system is being altered to cover such deficiences. New employees will be used to code approximately 5,000 polymer patents. Two subclasses, totaling 400 polymer patents, have already been coded and placed on cards. The large amount of information which each patent in this field contains requires an average of about 10 cards. This means that about 22 minutes are required for each search.

IBM-RAMAC device has been rented and research is going forward looking to ultimate use of this or a similar machine in the searching of patents of all classes. At present, however, only the disclosures of chemical patents are being considered. Patent Office is working with the National Bureau of Standards in an effort to utilize the SEAC electronic computer and other devices at Bureau.

Advantages of mechanized searching have now been "fully demonstrated" according to Patent officials. In addition to speed, the system also permits the searcher to investigate other aspects of a pending application. "This has resulted," according to the agency, "in instances of timely identification of obscure, but valid, evidences of prior knowledge affecting the patentability of a claimed invention, which only the highest degree of diligence, experience, and familiarity with the substance of the art can detect by nonmechanized means."

RESEARCH CHECKLIST

( ) Radium Solution Standards -- National Bureau of Standards has added a new series of radium standards to the list of radioactive samples it prepares and sells. The samples, widely used to control processes and maintain accurate equipment and apparatus, are said to be more accurate than those previously supplied. A certification of the radium content accompanies each sample issued.

(For further information, write National Bureau of Standards, Office of Technical Information, Washington 25, D.C.)

( ) New Water Pressure Indicator -- R&D at the New York Naval Shipyard has led to production of a water-indicating paste which changes color to detect leaks in pressure vessels at temperatures up to 500°F. Formula uses silver chromate, lead chloride and spar varnish.

(Report Available. 9 pages. 50 cents. Write OTS, U.S. Department of Commerce, Washington 25, D.C. for PB 151 127)

( ) Radiation Dosimeter -- Studies by the Navy indicate that the familiar photographic film badge currently used to indicate radiation exposure may be replaced by a simpler, solid-state dosimeter. One method, which demonstrates linearity of response and excellent storage of dose, is the manganese-activated calcium fluoride phosphor. A technique has been developed to reduce the problem of "predose" thermoluminescence.

(R&D by Solid State Division, Dielectrics Branch, U.S. Naval Research Laboratory, Washington 25, D.C.)

( ) Corrosion Research -- Studies at the National Bureau of Standards have led to a means for growing crystals of a desired orientation in "practically any shape." Equipment developed at the NBS permits researchers to grow the preferentially oriented metal monocrystals for use in studying the influence of crystal structure on corrosion.

(Report available. Free. Write National Bureau of Standards, Office of Technical Information, Washington 25, D.C. for Summary Technical Report No. 2360)

( ) Rocket Motor Insulation -- Research by Astrodyne Corp., McGregor, Texas for the Navy has led to development of a rubber-asbestos material expected to extend the burning time of present high-performance solid fuel rocket motors to three or four times the present burning periods of one minute or less. In tests, the new insulation held the exterior of a rocket motor case to about 200°F. while a high performance propellant generated a flame temperature of more than 5500°F.

( ) Gyro Bearing Production -- Air Force is interested in development of manufacturing methods for improvement of the yield and life of bearings used in spin axis Gyros for inertial guidance systems. Improved design, improved gaging equipment and development of new test standards are among the objectives.

( ) High Power Transistors - Air Force contract with Westinghouse Electric calls for development of manufacturing methods and fabrication techniques that will reflect mass production of high-power, high-temperature, fused silicon transistors. The devices are expected to be useful in airborne equipments such as static inverters, static relays, current and voltage regulators, servo-amplifiers and other components.

( ) Missile Re-Entry - Studies by the NASA have led to a simplified analysis of the velocity and deceleration history of ballistic missiles re-entering the atmosphere as well as an indication of means available to minimize aerodynamic heating.

(Report available. Free. Write NASA Technical Information, 1520 H Street, N.W., Washington 25, D.C. for NACA Report 1381)

( ) High Pressure Effects on Solids - Infrared spectroscopy is being employed at the National Bureau of Standards to determine the behavior of solids under pressure. Evidence has been found that solids undergo changes in molecular orientation at pressures of 30,000 atmospheres. Specimens of calcite have been compressed between diamond surfaces. Infrared transmission was then recorded, showing changes in frequencies, intensities, and patterns of absorption bands. The method is believed to have opened up a new and promising field of study.

(Report available. Free. Write National Bureau of Standards, Office of Technical Information, Washington 25, D.C. for Summary Tech. Report No. 2365)

( ) Data Signal Processing - Digital processing is being combined with digital data recording to study signal coherence, signal and background statistics and reverberation characteristics in underwater acoustic programs. A shipboard data-recording equipment which samples electrical signals coming out of a receiving transducer at any rate up to 500 samples per sec., permits accuracy 100 times conventional systems.

(R&D by Sound Division, Electronics Branch, Naval Research Laboratory, Washington 25, D.C.)

( ) Nickel Oxide Research -- Experimental conversion of powdered nickel oxide into sponge metal and nickel ingots has been described as a success by the U.S. Bureau of Mines. Surplus oxide powder was mixed with fine sizes of anthracite and with dolomite, formed into pellets and placed in covered ceramic containers, known as saggers. The studies included estimated cost-figures for commercial scale application.

(Report available. Free. Write Publications Distribution Section, Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa. for Report of Investigation No. 5456)

PUBLICATIONS CHECKLIST

( ) Ceramics and Glass, and their applications in modern aeronautics. A NATO report discussing the development of silicates, properties of these materials, and their applications. 15 pages. Free. (Write NASA, Technical Information, 1520 H Street, N.W., Washington 25, D.C. for Publication N-70211x)

( ) Defense Research, transcript of secret testimony, now released, on research and development plans, programs and policies of the Armed Services. Index provides a convenient guide to major items. 649 pages. Free, as available. (Write House Committee on Appropriations, The Capitol, Washington 25, D.C. for Department of Defense Appropriations, 1960 -- Hearings, Part 6)

( ) Helicopters, a newly-available guide for supervised on-the-job training of helicopter technicians. Information on care and maintenance as well as chapters on helicopter and convertiplane configurations, materials, bearings, and other fundamentals. 423 pages. $2. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C. for Publication No D 301.38/5:JA 43170)

( ) Defense Procurement, a booklet on how to sell to agencies in the Department of Defense, including a listing by general categories of what is bought, and by whom. 53 pages. 40 cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C. for Cat. No. D 1.2:se 4/958)

( ) Surplus Property, a guide to the type of surplus personal property available from the Armed Forces. Includes pertinent information on bidding and bidders' lists and addresses of military installations. 26 pages. 15 cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C. for Publication No. D 1.2:P 94/959)

( ) Nuclear Explosions, a report on the geomagnetic effects of high-altitude nuclear explosions based on data from the Johnston Island tests in the Pacific during 1958. Free. (Write National Bureau of Standards, Office of Technical Information, Washington 25, D.C. for Summary Technical Report No. 2362)

( ) Osculatory Interpolation Coefficients, a series of tables which are expected to afford a significant saving of computation time and effort for scientists in mathematics and physics and for all engineers -- particularly in the fields of aeronautical engineering, electrical engineering, gas and hydrodynamics. 30 cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C. for NBS Applied Mathematics Series 56)

( ) Nuclear Data Tables for 1959, presents ten compilations containing new data in fields of low-energy nuclear physics including scattering of charged particles, Mass differences and ratios, neutron cross sections, ground-state-neutron threshold energies and similar material. 160 pages. $1. (Write Superintendent of Documents, Government Printing Office, Washington 25, D.C. for 1959 Nuclear Data Tables)

( ) Mechanical Translation, a survey of the state-of-the-art in mechanical translation of foreign languages by means of high-speed electronic computers including activities of U.S. Government Agencies, commercial organizations, educational institutions and several foreign organizations. 63 pages. $1.75 (Write OTS, U.S. Department of Commerce, Washington 25, D.C. for PB 151 147)